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Agricultural Produce Processing Equipment — Glossary of Terms

(Second Revision)

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Agriculture and Food Processing Sectional Committee had been approved by the Food and Agriculture Division Council.

With the increasing emphasis on processing of agricultural produce particularly grains, seeds and fodder a large number of equipment are being manufactured and used in the country. A need was therefore, felt to prepare a standard giving authentic definitions to the various terms used in relation to these equipment.

This standard was first published in 1981. The first revision was taken up in the year 2000 to incorporate a number of new terminologies and up-date some existing definitions. This revision has been taken up to keep pace with the latest technological developments and international practices.

The composition of the Committee, responsible for the formulation of this standard is given at Annex A.

Indian Standard

AGRICULTURAL PRODUCE PROCESSING EQUIPMENT — GLOSSARY OF TERMS

(Second Revision)

1 SCOPE

This standard covers the definitions of various terms relating to agricultural produce processing equipment.

2 GENERAL TERMS

2.1 Abrasive — The property of particles of bulk materials, when in motion, to wear away the surface they are in contact with.

2.2 Abrasive Polisher — A machine is used to remove bran from endosperms, using abrasive action between the kernel and the emery stone.

2.3 Air Lock — An equipment used for introducing or removing mill stocks into/from pneumatic conveying line.

2.4 Atomizer — A machine for converting liquid material in finely divided spray.

2.5 Aeration — The process of movement of ambient air through grain at low air flow rate.

2.6 Angle of Internal Friction — The angle whose tangent is the coefficient of the internal friction between particles. The limit of this angle is a right angle.

2.7 Angle of Nip — The angle between the roll faces at the level where they will just hold a particle or grain and draw it into the crushing or husking zone.

2.8 Angle of Repose — When a granular material is allowed to flow freely from a point into a pile, the angle which side of pile makes with horizontal plane is called angle of repose.

NOTE — The angle of internal friction and the angle of repose are not synonymous because of the presence of interlocking and cohesive forces.

2.9 Aspiration — It is the process of cleaning by air blast and separating the foreign material which is substantially lower in specific gravity than the produce to be cleaned.

2.10 Polisher Brake — A long rectangular soft rubber block placed in an abrasive cone polisher between the wire mesh segments for restricting motion of kernels around the rotating cone.

2.11 Aspiration — It is the process of cleaning by air blast and separating foreign material which is substantially lower in specific gravity than the produce to be cleaned.

2.12 Blower — A device to produce air blast.

2.13 Block Flow — Diagram showing various sections of plant block without detailing individual machines.

2.14 Carborundum — A synthetic abrasive, whose hardness is about two and a half times that of natural emery. Chemically it is silicon carbide.

2.15 Chaffing — Pneumatic separation of very light materials from the produce. Also known as winnowing.

2.16 Cleaning — The removal of foreign or dissimilar material by washing, screening, hand picking, aspiration or any other means.

2.17 Colour Sorter — Equipment used for sorting out material/grains from stock on the basis of colour set to preset standard.

2.18 Conditioner — A machine in which grain is treated with any agent for mellowing purposes.

2.19 Conditioning — It is the process of changing the condition of grain/raw material to suit processing requirements. It is ordinarily achieved by addition of moisture or drying followed by tempering.

2.20 Corundum — Naturally available abrasive material used in polishers, also called emery.

2.21 Cracking — Development of fissures, checks or sun cracks on grains.

2.22 Curing — Natural or artificial aging of the agricultural produce brought about usually by some (dry or wet) heat treatment.

NOTE — In case of rice, it is the process of steaming freshly harvested paddy, so that rice undergoes a little heat treatment and attains to some extent the properties of aged rice.

2.23 Differential Speed — Ratio of speed of faster to slower rolls.

2.24 Diagram — Usually applied to a flow sheet.

2.25 Dust Collector — A machine for removing dust from exhaust air from a mill machinery.

2.26 Determination — Determination is a unit operation to separate oil rich germ from the endosperms of the kernel.

2.27 Degree of Milling — The amount of bran removed from the brown rice or seed coat removed from coarse grains during the milling operation. It is usually expressed as a percentage of the brown rice or milled cereals.

2.28 Dehydration — The removal of moisture to a very low level by applying external heat.

2.29 Drying — The reduction of moisture in a product to some predetermined moisture content, usually to equilibrium moisture content.

2.30 Elevator — A conveying equipment having a belt with buckets attached for lifting grains.

2.31 Exhaust — Air suction from any machine/ enclosure.

2.32 Edge Runner — A batch type machine to flatten partially cooked and dried paddy to produce rice flakes.

2.33 Emery Coated Polisher — Emery of specific grit size bonded with magnesium oxide and magnesium chloride coating on the surface of a roller/cone disc to provide necessary abrasion for polishing.

2.34 Fan — Bladed rotor in a fixed case, for exhaustive movement of air.

2.35 Filter — A chamber containing sleeve filter elements to treat dust laden air.

2.36 Firing — A process of applying heat to dry a substance rapidly as in processing tea.

2.37 Flaking Rolls — A machine for flattening partially cooked and dried kernels/grits continuously, as the kernels grits pass between a pair of heavy rolls in one pass.

2.38 Flotation — It is a process to remove light materials like bran from heavy materials like wheat by adding a flotation agent in the water.

2.39 Flow Sheet — Diagram showing distribution of stocks and machines in milling process.

2.40 Fluidization — Suspension of a layer of grain by the upward flowing air. When the frictional force between grain and upward flowing air counter balances weight of grains, layer of grain is said to be incipiently fluidized.

2.41 Gelatinization — The process by which starch granules change to a jelly like form and fill the voids in grains and cement fissures together at specific temperature.

2.42 Germination — Growth of the radicle and plumule in seed, when the latter absorbs adequate water and is placed in a normal environment of temperature and humidity.

2.43 Grading — The process of sorting grains into different lots conforming to certain predetermined standards.

2.44 Grader — An equipment to perform grading operation.

2.45 Grain Processing — The process of upgrading the quality of grains for improving their marketability, storability and suitability for human consumption.

2.46 Gravity Separator — A machine used for classifying and separating products with only slight difference in specific gravity differences.

2.47 Glazer — A machine used for removing the adhering bran from kernels under slight pressure to impart shine to the kernels.

2.48 Grinder — A size reduction equipment used to pulverize grains/kernels into grits and flours of desired size. Main machinery used in the process include burr mill, hammer mill, pin mill, disc mill, ball mill, etc.

2.49 Gyro Sifter — A grader in which whole kernel and broken are separated based on size by screening after passing them over a set of gyrating screens. Rotary or flat sieve could also be used for grading.

2.50 Grinding — Grinding is a unit operation of size reduction of grains or its parts with some dissociation of the anatomical parts of the grain from one another.

2.51 Glazing — Glazing is a unit operation done after milling to make kernels shinier or glossier by removing adhering particles on the surface.

2.52 Hulling — Generally refers to the removal of the outer shell or outer portion of the seed coat or grain that is hull. Hulling also refers to the removal of both hulls and bran as in the machine Engelberg Huller.

2.53 Humidified Polisher — Final friction polisher using humidified air for removing adhering bran and imparting shine to the milled rice grains.

2.54 Indented Disc Grader — A grader in which whole kernel or seed is separated from broken based on length which are picked up in the indents provided on a set of revolving discs.

2.55 Indented Drum/Cylinder Grader — A grader in which indents are formed in a cylindrical drum/ cylinder and revolves slowly and pick up broken and separate them from kernel mass, thus grading based on the length.

2.56 Leaching — The outward diffusion of water soluble constituents of kernel into the soak water during soaking process.

2.57 Malt — Designates a product resulting from the germination of a cereal grain, which is a rich source of hydrolytic enzymes and a main raw material for brewing.

2.58 Malting — Malting involves steeping, germination and kilning of sprouted cereals. It improves the bio-availability of nutrients, enriches the seed with hydrolytic enzymes and improves the aroma.

2.59 Mesh Opening — Aperture size of wire sieves. Normally measured in mm or micron.

2.60 Mixing — Mixing is a process of distributing as uniformly as possible by involving them in complex movements. It might be for solid-solid, liquid-liquid, liquid-solid, gas-gas, etc.

2.61 Milling — Refers to removal of hulls and bran from harvested and dried grain to produce refined stock.

2.62 Paddy Separator — A machine used to separate the ushelled paddy from the mixture of paddy and brown rice obtained after shelling.

2.63 Packer — A machine used for the filling of sacks and closing them.

2.64 Parboiling — It is the process of gelatinization of starch by imparting heat treatment to the soaked paddy or any other grains by steaming.

2.65 Pearling — This is another term used for polishing or whitening, mostly used for millets.

2.66 Peeling — The removal of the outer layer of a fruit or vegetable is generally referred as peeling. Also known as paring or skinning.

2.67 Pneumatic Conveying — The movement of stocks by use of controlled air currents.

2.68 Polishing — The removal of outer layer of the grain by mechanical operation. It is also known as whitening or pearling.

2.69 Popping — Roasting of conditioned whole grain with or without sand media to produce highly crisp, porous expanded product without retaining the grain shape. Popping is the result of sudden release of water vapour (steam) from the interstices of the kernel.

2.70 Primemover — Initial source of motive power.

2.71 Pitting — Pitting is a process in which the surface of the grain is scratched to impart cracks in husk/hull so as to facilitate penetration of oil or water in pulse milling. Also known as scratching.

2.72 Pre-treatment — Pre-treatment is the operation of treating the grain in order to loosen the husk or hull (seed coat) or ease of milling. The pre-treatment consists of water and/or oil application, soaking, drying and tempering, light roasting or chemical treatment in pulse milling.

2.73 Plansifter — Plansifter is a flat, horizontal sieve with a circular motion imparted at the central point of sifter with even number of compartments. The mixture to be sieved is fed in at the top, falling from sieve to sieve by gravity.

2.74 Puffing — It is due to sudden release of water vapour (steam) in the interstices of the kernel /granule. If the roasting of conditioned grain with or without sand media produces highly crisp, porous expanded product retaining grain shape.

2.75 Rice Glazing — Polished rice treated with talc (and in some cases with glucose).

2.76 Roasting — Roasting is the High Temperature Short Time (HTST) process in which the dry or water soaked grains are subjected to dry heating for a specified temperature range for a predetermined period of time with or without sand media.

2.77 Roaster — A machine which imparts heat to dry or wet grain with or without sand media.

2.78 Rollers — The unit consists of a pair of cylindrical rollers arranged with their axis parallel and set in a heavy frame. Rolls may be steel, stone or emery coated. They may rotate at same speed or differential speed in opposite direction inward.

2.79 Sampler — A probe for taking samples of grains from bags or from bulk containers. Also for taking from different depths.

2.80 Scalping — The process of cleaning in which good grains or seeds are dropped through screen openings (under flow) while larger material retained (over flow) is carried over the screen into a separate outlet.

2.81 Scarification — Scratching of hard seed coat to remove the mechanical barrier to obtain uniform germination with better penetration of moisture into the seed.

2.82 Screening — Separation of grains by a mechanical device where the desired material is carried over the device and the undesired material penetrates the device. It is a method of separating particles according to size alone.

2.83 Scouring — Scouring is the process in which outer layers (mainly those comprising the husk/hull) are partially removed through abrasive action. *Also see* polishing.

2.84 Seed Processing — The process of upgrading the quality of seeds for improving their plantability and storability.

2.85 Seed Treatment — The process of application of a thin coat or mixing of chemical (insecticide or fungicide or biological agents) over seeds or similar applications to provide nutrients or improve the storability and protect viability.

2.86 Sieve Aspirator — A grader which separates brokens from kernel mass by means of vibrating screens in conjunction with air stream. The traces of bran adhering to whole kernel and brokens are separated by an aspirator.

2.87 Separation — It is an operation in which a product is separated from other products, using the difference in physical, thermal, electrical or any other properties of the produce.

2.88 Shelling — Removal of grains from cobs or kernels from pods or husk.

2.89 Sieving — The separating of desired grains by a mechanical device, where the desired grain penetrates the device and the undesired material is carried over the device.

2.90 Sifting — It is the process of separating small size particle through sieves moved in circular motion.

2.91 Sifter — This is a machine used in the sieving operation of powdery material composed of a surface with regular openings having uniform shapes and dimensions and positioning in a regular manner as fixed in a frame. The surface may be wire mesh or perforated sheet metal.

2.92 Soaking — Process of complete immersion of grain in water to attain higher moisture content (upto saturation).

2.93 Sorting — It involves inspection, followed by separation according to variety, size, colour, degree of ripeness, maturity, defects, etc. It is actually a separating operation supplementary to grading.

NOTE — Sorting is a form of separation of food materials and food products at any stage of processing, whereas grading is done only during assembly and receipt of raw food materials for the purpose of establishing their commercial value.

2.94 Specific Mass — It is attributed to mass upon volume quotient. (kg/m^3 or g/l) of a liquid or a solid body.

2.95 Steeping — Process of allowing the grain soaked in water to attain higher moistrue content with the available free moisture after removal from soaking in water.

2.96 Tempering — It is a process wherein the grain is held temporarily in a bin, between two drying passes, so that the moisture content and temperature within the centre of the kernel equalize with moisture content and temperature on the surface of the grain.

2.97 Test Weight — Test weight of grain is the weight of a known volume of grains.

2.98 Thickness Grader — A machine which separates products on the basis of their thickness.

2.99 Trieur Cylinder — An indented revolving cylinder used for separation based on length. Example: Separation of broken from unbroken rice.

2.100 Under Runner Disc Sheller — A machine consisting of two horizontal discs, the top one Stationary and the lower one rotating. The discs may be emery or stone. This unit is used to remove husk/hull from the grain by compression and shear.

3 GRAIN PROCESSING EQUIPMENT

3.1 Aspirating Leg

A vertical duct in which the upward movement of a controlled air blast remove lighter grains and impurities from vertically falling grain.

3.2 Conveyor

An equipment or component through which material is moved from one point to other.

3.3 Cyclone Separator

It is a separating device in which strong centrifugal force acting radially is used in place of relatively weak gravitational force acting vertically downwards.

3.4 Destoner

A mechanical device which separates stones from the grain, based on difference in specific gravity.

3.5 Double Aspirating Separator

A separator which uses an aspirating leg both before and after sieving.

3.6 Elevator

A conveyor in which the material is moved upwards.

3.7 Friction Polisher

The type of polisher which operates on the principle of removing the bran from the kernel by using friction between the rice kernels and the screen in the polisher.

3.8 Gyro Sifter

A machine in which grains of smaller size are separated by passing them over gyrating screens. Small sized grains tend to get collected at the centre while the larger ones move towards the periphery and get separated.

3.9 Huller

A machine used for removing the hull from the grain.

3.10 Maize Sheller

An equipment to remove maize grain/kernel from cobs.

3.11 Paddy Sheller or Dehusker

An equipment to remove husk/shell from paddy grain.

3.12 Pre-cleaner

A separator to remove extraneous matter from grain before drying by means of sieves and an air-stream.

3.13 Reels or Revolving Screens

Cylindrical screens with slight inclination into which the material enters at one end and falls through openings into a collecting mechanisms while over-size material is discharged at the opposite end.

3.14 Rice Refining Machine

The machine to remove fine bran adhering to the kernel after whitening operation.

3.15 Riddle

Oscillating deck used for holding the grain of specific size, usually used in dockage tester.

3.16 Rubber-Roll Sheller

A machine used to remove husk from paddy. It consists of two rubber rollers, rotating with a differential speed in opposite direction inward and the paddy passing-between the two surfaces with clearance less than the mean thickness of paddy is dehusked by compression and shear.

3.17 Scalper

An equipment or screen used for pre-cleaning of grain.

3.18 Screw Conveyor

A type of conveyor in which a long screw is used to transport grains horizontally or on inclinations up to 30°.

3.19 Sieve Separator

A simple separator employing an oscillating sieve.

3.20 Single Aspirating Separator

A separator with a single aspirating leg.

3.21 Steel Huller or Metallic Huller

A machine used for paddy hulling. It consists of a fluted cylinder rotating within a steel screen and a steel blade.

3.22 Under-Run Disc Sheller

A machine which removes the husk from the paddy. It consists of two horizontal discs, the top one stationary and the lower one rotating. The discs may be emery or stone. This unit is used to remove husk/hull from the grain by compression and shear.

4 ROOT CROP PROCESSING EQUIPMENT

4.1 Potato Grader or Sorter

A machine used to grade potatoes according to size.

4.2 Reciprocating Potato Sorter

A potato sorter with reciprocating grids.

4.3 Rotary Potato Sorter

A potato with a rotating, perforated drum having appropriate size of peripheral openings.

4.4 Spool Type Potato Sorter

A potato sorter rows of spaced rotating spools.

5 FODDER PROCESSING EQUIPMENT

5.1 Chaff Cutter

A machine with blades for cutting the fodder.

5.1.1 *Cutter Head*

The assembly of the component which actually cuts the fodder. This may be of cylinder or fly-wheel type.

5.1.2 *Feed Interference*

The obstruction in advancing the fodder against the back of the blades.

5.1.3 *Feed Rolls*

The corrugated or slotted rolls placed one above the other to compress the fodder and to hold it firmly while cutting takes place.

5.1.4 *Throat of a Chaff-cutter*

The rectangular passage through which the compressed fodder passes for cutting.

5.2 Gandasa

A iron plate attached to a wooden handle and having cutting edge at one side and operated by hand.

6 MISCELLANEOUS EQUIPMENT

6.1 Delinter

A machine used to remove residual lint (fuzz) from cotton seed using acid or gas.

6.2 Groundnut Decorticator

A machine to separate groundnut kernels from pods.

6.3 Sugarcane Crusher

A machine used for expression of juice form sugarcane.

6.3.1 *Horizontal Sugarcane Crusher*

A sugarcane crusher in which the crushing rollers are placed in horizontal position.

6.3.2 *Vertical Sugarcane Crusher*

A sugarcane crusher in which the crushing rollers are placed in vertical position.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Agriculture and Food Processing Equipment Sectional Committee, FAD 20

Organization	*Representative(s)*
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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg CHANDIGARH 160019	265 0206 265 0290
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